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INTERREGIONAL ALLOCATION OF RESOURCES: THE CASE OF INDONESIA

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ABSTRACT This paper presents a simultaneous model of central-regional transfers based on a combined supply and demand-side framework. The model is designed specifically to evaluate the impacts of selected allocation criteria associated with such government transfers. As an application, the model is used for evaluating the allocation criteria for INPRES, which is one of the most important central-regional transfers in Indonesia. Results of the simulation indicate that regional capital growth is significantly affected by the transfers. It is also revealed that, despite the fact that the system of allocation used in the early 1980s is classified nonoptimal when viewed in terms of interregional equity, it still yields better outcomes than the currently adopted equi-size principle. The existence of a trade-off between maximizing growth of total GRDP and reducing interregional disparity is also revealed by the model simulation.

1. INTRODUCTION

In a system where a large proportion of regional revenues is furnished by central-regional transfers, issues of interregional allocation are of strategic importance. The main predicament always centers around the question of what is considered optimal allocation, given a multiplicity of objectives. More often than not, the actual outcomes of the transfer fail to match the desired goals.

Only a few quantitative analyses have been made on the subject. One of these, although aiming at a different objective, is the study done by Ravallion (1988; see also Booth 1987). The Ravallion study examines the implicit preferences of the central government with regard to the 1985/86 INPRES process. (INPRES — "instruksi presiden," or presidential instruction — is among the most important central-regional transfers in Indonesia.) Using the Kolm-Pollak welfare function, the study revealed the presence of a "mild absolute-inequality aversion" (p. 53) in central government preferences. Despite the attractiveness of the model and the intuitively acceptable outcome, indiscriminately generalizing the conclusion for all INPRES types is a major drawback of Ravallion's study. Each INPRES type has, in fact, distinct objectives, criteria, and instruments of disbursement.

Another study (Azis 1990a) looked at only a particular type of transfer in order to avoid overly generalized conclusions. Applying a similar approach to INPRES, as well as to another important central-regional transfer known as DIP ("daftar isian proyek" literally means "list of project proposals"), the author found that the impacts of different transfers were indeed unequal (Azis 1990b).

In this paper an analysis of INPRES transfers for provincial governments,

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hereafter called INPRES DATI-1, is conducted using a model that is designed specifically to evaluate the impacts of selected allocation criteria for central-regional transfers. The analysis involves evaluating simulated trends under three different scenarios covering Indonesia's fifth five-year development plan (ending 1993).

2. SOME INSIGHTS INTO THE INPRES PROGRAMS

Development of INPRES was triggered primarily by the unprecedented surplus of oil revenues flowing into Indonesia following the oil boom of the mid-1970s (although two of the eight INPRES program types had actually been launched in the early 1970s). Table 1 shows seven different types of INPRES programs and the corresponding allocation criteria for each. With the exception of the INPRES programs for municipal governments and rural areas, the adoption of these criteria may be open to challenge.

As in the case of most transfers, the purpose of INPRES is to nourish the financial capacity of regional governments. It is noteworthy that, for 27 provinces, although an average of approximately 96 percent of all development expenditures are financed by intraregional revenues, in a number of other provinces (for example Bengkulu, East Nusa Tenggara, Irian Jaya, and East Timor) the proportion of such revenues is less than 25 percent. This implies not only imbalances between regions but also the significance of central-regional transfers in the regional development process. In a recent study it is demonstrated that INPRES has been effectively benefiting the poor, especially in the low-income regions (Azis 1992). Indeed, many development projects beneficial to middle- and lower-income groups (e.g., small but effective infrastructure and other social overhead projects) rely upon this important government program.

Table 1 contains two broad categories of INPRES programs: block and non-block (also called categorical INPRES programs). Usually, block transfers provide local jurisdictions with considerable latitude to spend, while the categorical transfers are restricted to particular uses (although in many cases a priori approval is necessary before the actual transfer is made). The INPRES DATI-1, the largest of the eight types of INPRES programs, is officially considered to be within the block category. This implies that the central government has full control over the interprovincial allocation of these funds, but much less control over sectoral allocations at the regional level. This feature places DATI-1 INPRES in a strategic position, particularly with regard to the decentralization process.

The present format of INPRES DATI-1 is the result of a major revision in the overall system of central-regional transfers. The revision took place right after the completion of the first five-year development plan (1969/90 to 1973/74). The preceding system, known as ADO ("alokasi devisa otomatis" literally means "automatic allocation of foreign exchange"), was regarded as unfair to those regions making minimal contributions to export earnings since each province would, under the ADO scheme, receive allocations based on its contribution to export earnings.

The practical objective of DATI-1 is to help reduce such interregional disparities, although the official language is ambiguous. The stated goals are to promote a balance between sectoral and regional development, more equal

TABLE 1. Criteria for INPRES Allocations

	Block INPRES			Non-Block (Categorical) INPRES			
Types:	DESA Rural INPRES	DATI-2 Municipal INPRES	DATI-1 Provincial INPRES	INPRES for Elementary Schools	INPRES for Health Development	INPRES for Environmental Development and Regreening	INPRES for Road Development
Criteria:	Number of Villages	Population Size	Unclear	Number of Children Between Ages 7 and 12 and Availability of Elementary School Facilities	Availability of Health Facilities (1 PUSKESMAS with 3 to 4 PUSKESMAS PEMBANTU Per District)	Priority According to Land Erosion in Downstream River Basin	Subjective Criteria
	Equal Amount per Village Area	Minimum Grants for Low Density DATI-2	Equi-Size Principle (1988/89)				
	Rewards for LOMBA DESA	Performance of IPEDA Revenues	Land Area (1991/92)		Morbidity Rate	Forest Land Area Per Province and Per Municipality	

Notes: In addition to the above, there are two more INPRES-like grants: Zero-Interest Rate Credit for Market Restoration and Development, and Credit for Retail Stores Development (having a subsidized interest rate of 12 percent).

interregional growth, and greater regional participation in various development activities.

Unfortunately, the current allocation of INPRES DATI-1 is far from optimal. The criteria imposed by the central government are based on the maintenance of a certain gap between minimum and maximum amounts received by different provinces. Furthermore, the minimum amounts are to be raised periodically, depending on the government's financial position. No explicit mention of regional capacity or needs is made in the criteria. Beginning in 1981/82 a peculiar allocation was introduced, in which each of 22 regions received exactly the same amount: Rp 9 billion (or 4.37 percent of the total), while each of the other five regions was allocated Rp 11 billion (or equivalent to 5.34 percent). (This is known as the "5 and 22" criterion.) In other words, regions in the former category that have a small area and population size (e.g., Bengkulu) received an allocation equal to that received by regions that were much larger (e.g., East Kalimantan) or were more densely populated (e.g., Yogyakarta). The allocation was further distorted by the fact that selection of the five regions to receive the largest allocation was made based on ill-defined criteria.

Beginning in fiscal year 1988/89, the allocation criteria became even worse, in that each region received exactly the same amount (this is the "equi-size principle"). Even the recent provision of an addendum introducing land size as an additional factor to be considered does not remedy the deficiencies of the equi-size principle.

3. MODEL STRUCTURE AND ESTIMATION

In some cases either a demand-oriented or supply-constrained model may be capable of explaining a significant portion of observed interregional variations in output growth. With regard to supply-side models, it may be recognized, for example, that differential rates of increase in demand for regional output will affect interregional differences in output growth and that the demand factors themselves will have a strong influence on the relative movements of capital and on the increase of wages in different regions. A strong correlation between per-capita GRDP and the regional export share in Indonesia, for instance, provides support for a demand-oriented model (see Azis 1989).

Unfortunately, this type of model ignores entirely the possible role played by supply conditions (e.g., the nature of the production function, and determinants of factor prices and hence of factor mobility). On the other hand, supply-oriented models tend to ignore the possible effects of aggregate demand and its components on the determination of regional growth paths. Thus, neither model by itself offers sufficient support for generating an appropriate regional growth path. An integrated supply-demand model is, therefore, preferable. This model assumes that growth of inputs plays a significant role in the determination of output within the neoclassical tradition, but does not assume that input growth is the sole determinant of growth. The flowchart of the model constructed for this study is presented in Figure 1 (see also Table 2).

In the combined model, private consumption CP is modeled as a function of GRDP Y and population size POP. (All monetary variables are measured in constant 1975 prices.) Population size is included to allow interregional labor

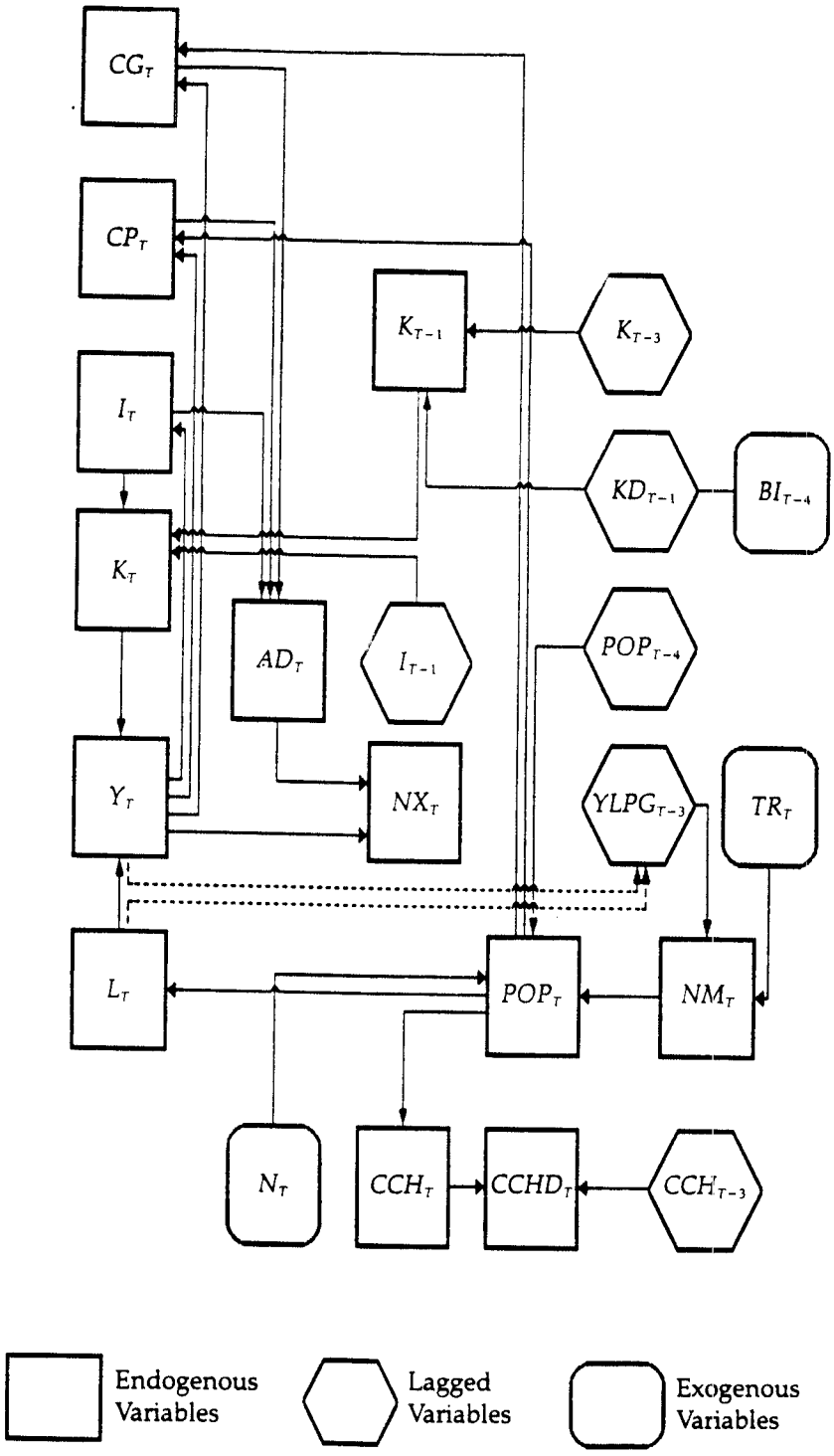

FIGURE 1. Flowchart of Model
Note: Variable names are defined in Table 2.

TABLE 2. Names of Variables in INPRES Model

AD	Aggregate Demands
BI	Interregional Allocation of INPRES
CCH	Per-Capita Household Consumption
CCHD	Incremental Per-Capita Household Consumption
CG	Government Consumption
CP	Private Consumption
I	Investments
K	Capital Stocks
KD	Incremental Capital Stocks
L	Man-Year Labor
N	Natural Rate of Population Growth
NM	Net Migration Rate
NX	Net Exports
POP	Population Size
TR	Interregional Allocation of Transmigration
Y	Gross Regional Domestic Product (GRDP)
YLGP	Interregional Gap of Per-Labor GRDP

mobility to play a role. The interaction between GRDP and population growth is captured in the model as follows:

$$CP_t = 20.63 + 0.29\ Y_t + 0.04\ POP_t$$
$$\qquad (1.08) \quad (2.08) \quad (2.34)$$
$$R^2 = 0.99 \qquad DW = 2.303 \qquad LLF = -123.93.$$

Note that the two-stage least-squares method is used to estimate all the equations in the model. For coefficients having low statistical significance, the respective variable is dropped.

Following the neoclassical framework, growth in capital stock *KD* may be expressed as a function of interregional differentials in rental price *RG* with a predetermined time-lag. However, since factor markets are imperfect, the rental price of capital cannot be singled out as the only explanatory variable for capital growth. Thus, other factors must be included in order to capture phenomena such as agglomeration economies and other forms of spatial juxtaposition. (One proxy that has been attempted for such factors is the increase in per-labor GRDP with a time lag YD_{t-1}. Finally, in line with the main context of the study, the growth of capital stock is assumed to be influenced by the interregional allocation of block INPRES funding, *BI*, which is measured in terms of its percentage distribution among regions:

$$KD_t = b_0 + b_1\ RG_{t-3} + b_2\ YD_{t-1} + b_3\ BI_{t-3}.$$

It was found from the estimation that *RG* and *YD* are both insignificant. Therefore, in the revised model only *BI* was used as an explanatory variable for *KD*.

Different periods for *RG* were also attempted, but none of them improved the significance of the coefficient. Even when other proxies for capital earnings were used (among others, the interest rate applicable in each region), no improvement was detected. Indeed, in practice, more othen than not, private investments in the Outer Islands are financed by — or belong to — capital owners residing in Java. In some cases, cross-region financing can also be found among provinces in the Outer Islands. Hence, using the interest rate as the determinant of capital growth would actually tend to yield an unsatisfactory

outcome. The proxy variable for agglomeration economies, GRDP growth YD_{t-1}, also failed to improve the estimation.

Therefore, the following equation was used:

$$KD_{83} = -170.46 + 7137.28\ BI_{80}$$
$$(-3.42) \quad (8.19)$$
$$R^2 = 0.77 \quad DW = 2.109 \quad LLF = -139.25.$$

The absence of data on capital stocks at the regional level, let alone at the national level, is common in many countries; Indonesia is no exception. Consequently, the perpetual-inventory model was used to estimate capital stocks. From this standpoint, stock data are sensitive not only to the size of regional investments but also to the assumption regarding the depreciation period being used. Meanwhile, capital growth, along with the initial stock, will affect capital stocks in the subsequent period K_{t-1}; this, in turn, will determine the size of capital stocks in year t, K_t, given the level of investments in $t - 1$ (I_{t-1}). Thus,

$$K_t = K_{t-1} + I_{t-1}.$$

Following Ghali (1981), regional investments are expressed as a function of total aggregate demand (including net exports). In this particular case, the inclusion of net exports is necessitated by the fact that exports play a crucial part in unraveling the fluctuations of many Indonesian regions' GRDP. Being excluded from the aggregate demand equation, net exports are important as an equilibrating force to reconcile the gap between aggregate demand and supply. With such a treatment, the extent to which net exports in each region affect the time-path of interregional disparity could also be analyzed. Thus, the GRDP denoted by Y_{t-1} is used instead of total aggregate demand AD_{t-1}. Within the original model an attempt was also made to include total earnings of capital EC in the investment function

$$I_t = c_0 + c_1\ EC_{t-1} + c_2\ Y_{t-1}.$$

However, it was found that EC was not only insignificant but also had an unexpected sign. Therefore, in the revised model this variable was omitted:

$$I_t = -28.54 + 0.30\ Y_{t-1}$$
$$(-1.53) \quad (19.03)$$
$$R^2 = 0.95 \quad DW = 2.623 \quad LLF = -124.05.$$

The omission of EC should not be surprising since in practice regional investments are determined by numerous other variables. There are a considerable number of distortions and other nonmarket factors affecting the decision on investment location, an important one of which is the support of conducive infrastructures. In many cases this factor can even defeat standard constraints, including transport costs. For example, better conditions of infrastructure (telecommunication, financial services, electricity, and power generation) in Java, the main island and most developed region in the country, had brought about a heavy concentration of economic activities, including those of the resource-base type. This stipulates a situation where transport costs of raw materials in the

classical Weberian tradition can be subdued by nontransport-related infrastuctures.

The regional government consumption CG is assumed to be determined by GRDP and population size. The inclusion of population in the model was based on the notion that some expenditure components, such as wages and salaries, are related to population size:

$$CG_t = -13.30 + 0.09\ Y_t + 0.01\ POP_t.$$
$$(-2.33)\quad (2.04)\quad (2.42)$$
$$R^2 = 0.91 \qquad DW = 1.443 \qquad LLF = -97.43.$$

The population size in a particular year is determined by its level in the initial period, natural growth N, and net-migration NM:

$$POP_t = (1 + N_t + NM_t)\ POP_{t-4}.$$

Net migration was originally expressed as a function of the gap in per-labor GRDP $YLGP$, the incremental per-capita household consumption $CCHD$, and the interregional transmigration allocation TR:

$$NM_t = e_0 + e_1\ YLGP_{t-3} + e_2\ CCHD_t + e_3\ TR_t.$$

However, although the result displayed the expected sign, the coefficient for $CCHD_t$ was found to be insignificant. Yet the inclusion of economic variables is conceptually important in order to endogenize net migration. This has been supported by the findings of several studies on migration in Asian countries which indicate that, in general, noneconomic factors have far better explanatory power than the standard economic variables (Hauser, Suits, and Ogawa 1985). Therefore, the economic variable $YLGP_{t-3}$ was attempted and found to be significant:

$$NM_t = 0.01\ YLGP_{t-3} + 0.21\ TR_t$$
$$(2.29)\qquad (4.55)$$
$$R^2 = 0.60 \qquad DW = 2.18 \qquad LLF = 64.42.$$

As expected, the coefficient for transmigration allocation TR_{85} was found to be most significant. Indeed, since the launch of the transmigration program, population distribution has been markedly affected, in spite of several problems in the program.

The gap in per-labor GRDP is expressed as

$$YLGP_i = (YL_i - YL)/YL,$$

where YL_i is the per-labor GRDP in region i, YL is the average (national) per-labor GRDP, and the transmigration allocation TR_i is the interregional percentage of allocated transmigrants. Since $CCHD_t$ was not found to be not significant, this variable was dropped in the revised model. The endogenous population variable could be indirectly determined by INPRES allocation.

In the supply side of the model, a general Cobb-Douglas form was assumed for the regional production function. Unlike the usual form of the Cobb-Douglas function, however, the element of technological progress was not included in the model in order to avoid an excessively restrictive assumption regarding the

constancy of parameters in a cross-sectional estimation. (One cannot simply introduce a term that depends on the passage of time because there is, essentially, only one point in time.) There is, however, a price to be paid. Ignoring technological progress when such a phenomenon really occurred (for example, in dynamically growing regions where the adoption of modern technology is inevitable) would result in an underestimation of regional products

$$Y_t = K_t^{0.35} \cdot L_t^{0.56}$$
$$(2.33)\ (4.53)$$
$$R^2 = 0.91 \qquad DW = 1.75 \qquad LLF = -4.41.$$

As shown above, this estimation generates a less-than-unity sum of input parameters. While both coefficients were significant, the labor parameter was not only larger but was also more significant. The coverage of 22 regions, however, requires any conclusion to be interpreted with care.

Next, it was necessary to determine which impact variables should be used. Five impact variables were selected: regional per-capita private consumption, *CPCAP*, per-capita GRDP, *YCAP*, per-capita household consumption, *CCH* (taken from Survei Sosial Ekonomi Nasional — SUSENAS), per-labor GRDP, *YL* and the size of the GRDP, *Y*. Data on *CCHD* in real terms were derived by using the average regional living cost index as the deflator.

4. SIMULATION RESULTS

The choice of indicators turned out to be very crucial, for each generated different outcomes under all three scenarios attempted (see Tables 3 and 4). In the static simulation the equi-size principle appeared to generate a divergent path for all variables (*YCAP*, *CPCAP*, *CCH*, and *YL*); the trend of *Y* was the only exception (see Table 3). This finding is exceptionally relevant in view of the fact that the equi-size principle has been employed since 1988. Intuitively, such a principle is hard to justify because it neglects the variability in needs, capacity, and potentials of the different provinces. Even more serious is the fact that it does not correspond to the original objective stated in the plan document. Therefore, it is very doubtful that a systematic plan has been developed to carry out such an important resource allocation.

It was stated earlier that, from the viewpoint of proximity to welfare, indicator *CCH* seems to be a better guide, particularly after taking into account

TABLE 3. Results of Static Simulation: Interregional Disparity Under Three Scenarios

	Scenario 1 With 1980/81 Block INPRES Allocation	Scenario 2 With Equi-Size Principle	Scenario 3 With 5 and 22 Criterion
Coefficients of Variation for:			
1. Per-Capita Private Consumption (*CPCAP*)	0.1335	0.1867	0.1819
2. Per-Capita GRDP (*YCAP*)	0.2039	0.2651	0.2583
3. Per-Labor GRDP (*YL*)	0.1452	0.2048	0.1975
4. Per-Capita Household Consumption (*CCH*)	0.2400	0.3234	0.3154
5. Total GRDP (*Y*)	1.4514	1.3248	1.3422
Total Sum of GRDP (Rp Trillions)	16.6200	16.8400	16.8300

TABLE 4. Results of Dynamic Simulation: Some Indicators of Interregional Disparity Under Three Scenarios for the Period 1984 to 1993 (End of Five-Year Plan V)

	Scenario 1 With 1980/81 Block INPRES Allocation		Scenario 2 With Equi-Size Principle		Scenario 3 With 5 and 22 Criterion	
	1984	1993	1984	1993	1984	1993
Coefficients of Variation for						
Per-Capita Private Consumption (*CPCAP*)	0.1335	0.1315	0.1867	0.2153	0.1819	0.2061
Per-Capita GRDP (*YCAP*)	0.2039	0.2789	0.2651	0.3246	0.2583	0.3111
Per-Labor GRDP (*YL*)	0.1452	0.2174	0.2048	0.2551	0.1975	0.2392
Per-Capita Household Consumption (*CCH*)	0.2400	0.3058	0.3234	0.3864	0.3154	0.3730
Total GRDP (*Y*)	1.4514	1.4227	1.3248	1.1143	1.3422	1.1543
Average Annual Growth Rate of Total GRDP 1984–1993	3.12%		3.14%		3.2%	
Person-years of Employed Labor (thousands)	53,616	66,257	53,616	66,258	53,616	66,257.9

the nature of data collection and the definition of variables. The coefficient of variation for this variable increased considerably from 0.24 to 0.32. Unlike *CCH*, however, *CPCAP*, *YCAP*, *YL*, and *Y* were all taken from regional accounts that are designed on a production-origin basis, rather than on the basis of actual income accrued to local people.

Interestingly enough, the sum of GRDP under the equi-size principle is larger than the one produced under the 1980/81 allocation (Rp 16.8 compared to Rp 16.6 trillion). There seems to be a classical trade-off between the goal of disparity reduction (equity) and that of maximizing total output (efficiency). A further check on the presence of such a trade-off is included below in the discussion of the results of the dynamic simulation.

When compared with the 5 and 22 formula, the results confirmed what was concluded earlier, that the equi-size principle is the least-preferred choice.

To provide a stronger basis for the hypothesis, a dynamic simulation was conducted by generating alternative scenarios for the period ending in 1993; the results are depicted in Table 4. Given a predetermined system of allocation, the repercussions of the INPRES program are not only being registered in the GRDP or regional consumption, but will also eventually affect population size (hence the size of the labor pool; see the dotted arrows in Figure 1).

By 1993, under scenario 1, the interregional variation of GRDP proved to be lower than that recorded for the base year (1.42 compared to 1.45). Observed from the perspective of the year-to-year simulated values, however, the declining trend was not monotonic. An increase in the coefficient of variation occurred in 1992 after a persistent decline from 1984 to 1991, then was followed by another decline in 1993. It is evident that the intricate nature of the interconnection among variables does not guarantee monotonicity in the movement of impact variables. This supports the important policy-related conclusion that there is no single criterion of allocation that could be consistently maintained as optimal over time. In other words, regular reviews of the criteria are necessary.

In terms of the per-capita and per-labor indicators, divergent patterns are

evident except for *CPCAP*. Taken at a very slow pace, the per-capita private consumption shows a convergent path. Nonetheless, in all cases the trends are once again non-monotonic.

The more representative indicator *CCH* was assumed to be directly related to per-capita GRDP. It is, therefore, not surprising that, when measured in terms of these two indicators, some divergent patterns should have emerged. While the coefficient of variation for per-capita GRDP increased from 0.20 in 1984 to 0.28 in 1993, that for *CCH* surged from 0.24 to 0.31 (see Table 4).

The equi-size principle (scenario 2) was also tested. The results showed that greater disparity among almost all of the indicators was likely to emerge under this scenario. In fact, the degree of disparity was even greater than in scenario 1. In comparing the finding with the projected growth of GRDP, the presence of a trade-off between maximizing total GRDP and reducing interregional disparity was confirmed. In every single year from 1984 to 1993, the size of the total GRDP under the equi-size principle turned out to be greater than that under the 1980/81 allocation scheme (i.e., 3.14 percent versus 3.12 percent).

The 5 and 22 criterion (scenario 3) was equally undesirable for it generated a worsening disparity in 1993. In comparison with scenario 1 the criterion did not yield better results in terms of disparity reduction, but it did produce better results when compared to the equi-size principle. More interesting is the observed higher growth rate of total GRDP produced under the 5 and 22 criterion (see Table 4). It is clear that the nature of the trade-off does not always remain the same under different scenarios.

Assuming a constant rate of labor-force participation, the average annual growth of employed labor during the period was expected to reach approximately 2.4 percent for all scenarios. The largest difference was found to be that the equi-size criterion only yielded approximately one thousand more person-years of labor than the 1980/81 criteria produced. But, judging from annual trends, if a longer period of projection were used, the gap would be unequivocally greater. With annual GDP growth rate in the neighborhood of 3.12 percent, the increase in employment size from 53.6 to 66.3 million implies an employment elasticity factor of around 0.7.

The predicted interregional variation of labor was insignificantly greater under the 1980/81 allocation system than under the equi-size criterion (1.4475 compared to 1.4422). This suggests slightly better results for the equi-size principle, notwithstanding the fact that all scenarios actually produced decreasing variations between regions from 1984 to 1993.

5. CONCLUSIONS

The simultaneous nature of the model discussed above is evident from the indirect impacts of INPRES upon the population size. Assuming a constant labor-participation rate (but allowing for interregional variation), the model is capable of revealing the effects of the program on labor force size. The endogenous treatment of the population variable allows linkage of demographic indicators with the target variables of per-capita GRDP, per-capita regional consumption, per-labor GRDP, and per-capita household consumption. This, in

turn, produces simultaneous repercussions of demographic and economic variables (including INPRES allocation) upon the target variables.

It was revealed from the model estimation that regional capital growth, hence regional productive capacity, was significantly affected by INPRES funds. The process will likely have an impact on various facets of intraregional economy through employment creation, poverty alleviation, and encouragement of self-sufficiency. Viewed from the interregional distributive aspect, DATI-1 transfers during the early and mid-1980s yielded relatively better outcomes than the currently adopted equi-size principle. In other words, while the 1980s allocation reflects a condition that is perhaps equivalent to "mild absolute inequality aversion of the center" (Ravallion 1988), the current allocation will likely create detrimental effects on the regional balance. Should it be maintained throughout 1993, interregional disparity will tend to widen.

Based on this finding, it must be argued that a systematic rationale is lacking in the planning of INPRES DATI-1 allocations. Unfortunately, a more rational solution has yet to be found. The dynamic simulation produces results that are not very encouraging. Notwithstanding their superiority to the equi-size principle, the 5 and 22 criterion and the 1980/81 allocation are far from optimal (optimality in this case is defined as minimization of the disparity between regions). Furthermore, in terms of employment creation, neither of the two systems is any better than the equi-size principle, although the differential in magnitudes is rather insignificant (only about 1,000 person-years of employment).

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